DOCUMENT RESUME

ED 233 250 CG 016 827

AUTHOR Carline, Jan D.
TITLE School Psychologists and Clinical Judgment: Patterns of Data Utilization.
PUB DATE Apr 83
NOTE 29p.; Paper presented at the Annual Meeting of the American Educational Research Association (67th, Montreal, Canada, April 11-14, 1983).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Ability; *Competence; *Decision Making; Diagnostic Tests; *Educational Diagnosis; Educational Psychology; Elementary Secondary Education; Learning Disabilities; Performance; *Psychological Evaluation; *Reliability; *School Psychologists

ABSTRACT

School psychologists function as experts in the diagnosis of childrens' educational difficulties. Can the decision-making activities of school psychologists be characterized as expert? Practicing school psychologists (N=10) reviewed cases of children (N=120) being considered for placement in learning disabilities programs. A case consisted of 17 educational cues, including scores from achievement tests and ratings of other aspects of academic and social performance. The psychologists rated each cue as to its relevance to the diagnosis of learning disabilities for the child represented in the case, and then offered a diagnosis for the child. Analysis of the ratings of cues and the diagnoses described the decision-making characteristics of each psychologist. Statistical analysis showed that the ratings of cues and decisions were highly correlated for each psychologist, indicating great consistency in the ways that individual cues were related to diagnoses. Further, the psychologists clustered cues in similar fashions when approaching a decision. The decision-making activities represented in these results may be characterized by logical and orderly processes. If orderliness is an important characteristic of expert abilities, then the results indicate that the decision-making of school psychologists may be deemed expert. (Author/WAS)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED233250

SCHOOL PSYCHOLOGISTS AND CLINICAL JUDGMENT: PATTERNS OF DATA UTILIZATION

Jan D. Carline, Ph.D.
University of Washington

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☐ This document has been reproduced as received from the person or organization originating it.

☒ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Jan D. Carline

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

CG 016827

Paper presented at the Annual Meeting of the American Educational Research Association, Montreal, Canada, April 11-14, 1983.

School Psychologists and Clinical Judgment: Patterns of Data Utilization

Jan D. Carline, Ph.D.

University of Washington

This study is focused on the decision-making activities of school psychologists. School psychologists frequently make diagnostic decisions affecting the school history of a child, often altering other aspects of the child's social life. The school psychologist is accountable to the child, the child's parents, as well as to the educational and governmental agencies for which such decisions are made. Recent governmental guidelines for diagnostic decisions, as well as the increased political strength of the parents of handicapped children serve to highlight the serious impact of the decisions made by school psychologists.

Such decisions are not easily made. The information on which decisions must be made is often of varying validity and reliability. The interpretation of a test score is not always unambiguous, particularly when contradictory information is frequently found for the same child. Additional information in the form of test scores, behavioral observations and the like, may add to the list of possible interpretations of the child's state rather than acting to limit the range of possibilities. Further, studies in information processing have pointed to man's limited abilities to handle large amounts of data (Phelps and Shanteau, 1978). The school psychologist's attempt to develop a comprehensive picture of a child by the inclusion of many pieces of information may result in the overtaxing of his or her abilities.

The decision-making tasks that school psychologists are called upon to face are difficult and multifaceted. It would seem wise that educators of school psychologists should pay attention to the processes by which their students utilize data in the forming of diagnostic decisions. Unfortunately, little attention has been paid to such cognitive processes of students or practicing school psychologists. Most published research has focused on the normative nature of test data and factors leading to biased usage of data (Dewitte 1976, Goldstein 1973, Chasen 1974). Much less work has been completed to describe or model the ways in which school psychologists reach decisions. McDermott (1977) studied diagnostic decisions of school psychologists having varying amounts of professional experience. The school psychologists, grouped by length of experience, could be distinguished by differences in the amounts of time attention was paid to various types of information included in a child's case file. The groups were not found to be different either in the accuracy of their decisions or in the confidence placed in those decisions.

Soethe (1976) conducted a study employing multivariate analysis in the description of diagnoses made by school psychologists. The judgments of social workers, special educators, school psychologists and counselors were compared concerning the placement of children in counseling or special academic programs. Each judge was presented with forty cases containing four cues about a child: Intelligence Quotient, academic achievement, ratings of aggression, and emotional withdrawal. The judges were asked to rate each of the cues before indicating if the child needed counseling or academic remediation. These ratings were subjected to statistical analysis. Judgments made by the professional groups were found to differ in a number of subtle ways. Unfortunately, the Soethe study is marred by the relatively

meager amount of information provided for each case. Typically, school psychologists collect a large amount of information in the form of test scores, reports of behavior, and actual observations of children before a diagnostic or placement decision is reached.

The findings resulting from these and other similar studies have not been fully successful in describing the cognitive processes used by school psychologists.

School psychologists are asked to function as experts in the diagnosis of children's educational difficulties, and in the prescription of remedial programs. The question remains: Can the decision-making processes of school psychologists be characterized as expert?

The characteristics of an expert judge, or decision maker, have frequently been discussed in the psychological literature (Shanteau and Phelps, 1978). These characteristics have included the following:

1. Expert decision makers are highly reliable in the observation and evaluation of information.

2. Experts give weight to information in similar ways in reaching a judgment.

3. Experts tend to seek the same type of information and to cluster the information in similar fashions when approaching a decision.

Multivariate analysis may be used to investigate these assumptions about the decision-making characteristics of experts. Multiple regression analysis has been used to develop linear prediction equations that have proven successful in predicting the decisions of numerous professionals (Slovic and Lichtenstein, 1971). The professionals have included stock brokers (Slovic, 1969), personnel officers (Robinson, Wahlstrom, and Meacham,

1974) and nurses (Palisin, 1977). Factor analysis has been used to identify sets of variables which have been treated or rated in the same fashion in decision situations. This technique has been used as a strategy to reduce the number of cues that must be accounted for in the analysis of decisions (Schmidt and Coyle, 1976) as well as to identify the possible cognitive organization of cues by decision makers (Palisin, 1977; Beatty, 1977).

There has been continuing controversy over the applicability of such techniques to the study of decision processes. Although the techniques have been successful in predicting decisions, that success may stem from the general robustness of the statistics rather than from their ability to describe the actual cognitive processes by which decisions are reached (Dawes, 1979). An intuitive view of this problem can be seen in the lack of match between a subject's stated policy of how information is used and a statistically derived policy as found in a number of studies (Cook and Stewart, 1975): Either the subject is not really aware of how information is used when a decision is made, or the statistical technique is able to make a prediction of the decisions without respect to the processes utilized by the subject.

An additional issue has been discussed in the recent work of Phelps and Shanteau (1978). They investigated the effects of naturalistic data in studies of diagnostic decisions made by livestock judges. When judgments of the qualitative aspects of an object, which are naturally intercorrelated--in this case physical aspects of livestock--form the data upon which multivariate techniques are employed, the results may be very misleading. When naturalistic data is used in a decision task, the results may indicate that the judge acts on only a few cues in reaching a decision. This might imply that the cognitive abilities of the judge limit the amounts of information

that can be handled in making a decision. When data, artificially constructed to be orthogonal, is used in a decision task, judges are seen to employ a greater amount of information in reaching a decision.

The applicability of "expert" characteristics to the decision making of school psychologists, and the utility of multivariate techniques in describing decision-making characteristics form the major emphasis of this study. The working hypotheses suggested that school psychologists would be reliable in their utilization of data, that they would combine and give weight to data in similar fashions when making decisions, and would cluster information in similar fashions. The study was constructed to allow some investigation of the appropriateness of the statistical techniques to the description of the day-to-day diagnostic decisions of school psychologists. As school psychologists have available large amounts of information about a child from a number of sources, the study was constructed to include a large number of cues. Further, care was taken to insure that the diagnostic task would be relatively representative of the day-to-day activities of the school psychologist.

Method

Subjects

Subjects were ten, practicing, school psychologists working in the Puget Sound Basin. All subjects had completed a basic master's degree in school psychology leading to their certification in the profession, and had practiced in the professional role for at least one year.

Materials and Procedures

The decision task chosen for the study was the diagnosis of learning disabilities in school-age children. Although there is continuing debate over the validity of this diagnostic category (Coles 1978), it is one frequently used by school psychologists when making placement decisions for children. A survey of fifteen school psychologists was conducted to obtain a list of tests, background information, and any other type of information deemed necessary in the diagnosis of learning disabilities. From this list, seventeen items, cues, were picked to be included in a case format. Cues consisted of academic test scores, intelligence test scores, ratings of behavior and developmental status, sex, age and grade placement of the child.[1] Cues were presented in the form of actual scores or marks on a clearly labeled scale. Using this format, data was obtained from the files of children tested in a teaching laboratory in the College of Education, University of Washington. Files were chosen with the limitations that the child was in grades 1 to 6, and that the file was the result of a complete psycho-educational evaluation. Files were chosen without respect to the diagnosis included in the reports.

Each subject was requested to review 120 cases presented in random order. A rating of each cue was indicated on a scale of "1--Definitely not indicative of a learning disability" to "5--Definitely indicative of a learning disability." After rating the cues for a case, subjects indicated their diagnosis on a similar scale of "1--Definitely not learning disabled" to "5--Definitely learning disabled." The ratings of the cues and the diagnoses formed the data to be analyzed by multivariate techniques.

Pilot Study

A pilot study with four additional school psychologists was completed to obtain estimates of the time needed for the task and to test the general validity of the instrument. The school psychologists reported that the diagnostic task was clear and fairly represented the amount of information available when making a similar decision in their practice. The naturalistic quality of the task was limited only by the lack of personal contact with the children represented in the cases.

Subjects' Stated Policies

During a brief instructional session in the subjects' homes or offices, the subjects were shown a blank copy of the case format. Subjects were asked to indicate the usefulness of each cue in making a decision about learning disabilities with a scale of "1--Not useful" to "5--Extremely useful." Responses to this task formed the subject's stated policy for the use of information in the diagnosis of learning disabilities.

Setting

The subjects completed the cases in their homes or offices. Each subject took roughly six hours to complete the 120 cases over a period of two weeks. Subjects generally reported a fascination with the task in observing their confidence and consistency in approaching the cues and the diagnostic procedure itself.

Results

Predicting the Subjects' Diagnoses--Multiple Regression Analysis

With the diagnosis of learning disabilities as the dependent variable and the ratings of the seventeen cues as predictor variables, a stepwise

multiple regression analysis was performed on the z-score transformations of the responses for each subject. The results for this analysis are reported in Tables 1 and 2. The multiple correlation coefficients varied from .94 to .72 with an average of .85. The proportion of the variability in the dependent variable that can be predicted from the cues is the square of the correlation coefficient, R^2. Adjusted for shrinkage (Nie, Hull, Jenkins, Steinbrenner, and Bent, 1975), the R^2 coefficients varied from .88 to .52 with an average of .73. The relative weights associated with variables that entered the prediction equations, reported in Table 2, have been adjusted for comparability by the formula suggested by Hoffman (1960). The following cues entered into the prediction equations for at least five subjects: Spache reading score, Performance IQ vs. Verbal IQ, Wide Range Achievement Test (WRAT)--Spelling, Wide Range Achievement Test (WRAT) -- Arithmetic, Academic History, Woodcock reading test score, and the measure of Visual-Motor Integration(VMI). The variables of Sex of the child, and Age and Grade placement did not enter any equations.

The results of the multiple regression analysis indicate that a linear combination of the ratings cues can successfully predict a large percentage of the variability of the diagnoses for all subjects. The size of the multiple correlation coefficient is not dependent on the number of cues that enter the prediction equations. There is no distinct grouping of subjects by the relative size of the multiple correlation coefficients found for the prediction equations. The cues and their associated relative weights for the prediction equations vary from subject to subject.

Identifying Organization of the Cues--Factor Analysis

The ratings of the cues were subjected to a principal components factor analysis and rotated to varimax criteria as reported in Table 3. The number

of factors found varied from subject to subject though the percentage of variance accounted for by the factors was consistently in mid-range of 62.8% to 68.9%. Loadings on the first factor identified for each subject, reported in Table 4, seems clearly to be composed of academic achievement data. With the exception of subject 5, the first factor includes the Spache reading score, WRAT - Reading, and the Woodcock Reading score. The first factor for subject 5, consisting of the three WRAT scores, may represent an aggregation of these scores by virtue of their identification with the same test battery. The second factor for subject 5 contains the remaining academic variables included in the first factor for all other subjects.

In contrast to the continuity of the first factor among subjects, there is little similarity in the contents of other factors among subjects. The contents of the second factor differs from subject to subject. And although there are some suggestive combinations of cues on selected factors for a few subjects, there are essentially no interpretable factors to be found beyond the first.

Comparison of Stated and Derived Policies

The stated policies of the judges are found in Table 5. A rating of "5" indicates that the judge found the cue to be extremely important in making a diagnosis of learning disabilities, while a lower rating indicates less importance of the cue. The statistical importance of cues to the diagnosis is estimated by correlating the ratings of cues with diagnoses (see Table 6). The correlations (Kendal's Tau) of the stated and derived policies, reported in the lower section of Table 5, ranged from -.65 to a high of .12, with an average of -.19. By this measure, the stated and derived policies of the school psychologists are not similar. Can it be concluded that school psychologists are unaware of the importance they contribute to cues in making

diagnoses? There is some evidence to suggest that the use of linear correlations to compare stated and derived policies is misleading.

Observation of the frequencies of response for certain variables may help explain the lack of correlation between stated and derived policies. Table 7 presents the response frequencies for each cue given by subject 4. This subject's responses are presented as representative of all subjects for this study. For subject 4, the variables of Age and Grade, Development, Full Scale IQ, Performance IQ vs. Verbal IQ, Attitude, and Behavior were stated to be most useful or important in making a diagnosis of learning disabilities. Yet these variables received few values other than neutral when they were rated in the cases. This pattern seems particularly applicable to Full Scale IQ for all subjects. Other cues received nearly the full range of values when rated in the cases. This pattern of limited variability in response to some cues is not due solely to order of the cues as it is associated with cues throughout the case format. Subjects had also been permitted to review the full contents of a case before marking and rating the individual cues.

It might be that only in limited circumstances represented by a particular constellation of other cues, will a specified cue become crucial to the school psychologist's diagnosis. Until those circumstances are present in a case, a variable which is stated to be important will be rated as neutral.

Full scale IQ was not rated as indicative of learning disabilities for four subjects: subjects 1, 4, 8, and 9. Five subjects, 3, 5, 6, 7, and 10, rated Full Scale IQ as indicative of learning disabilities five or fewer times each. Scattergrams were constructed to visually inspect the relationship of the rating of Full Scale IQ with the actual value of Full Scale IQ. The scattergrams indicated that values of IQ below roughly 85 were rated as not indicative of a learning disability. All other values of IQ were rated as neutral. The infrequent ratings of IQ as indicative of learning disabilities

conformed to no consistent pattern. In the case of Full Scale IQ, if the IQ is low, the cue is seen as ruling out Learning Disabilities. If the Full Scale IQ is average or above, the cue is seen as neutral in itself. Consequently, although the cue may be stated to be highly salient in making a decision, it generally has a small correlation with actual diagnosis. The relationship of rated importance and statistically derived importance, as noted in the Tau correlation coefficients, is a spurious estimation of this relationship. The diagnostic meaning of some cues may not be expressed on a linear scale and cannot be accounted for by a linear correlation.

Effects of Naturalistic Data in This Study

Performance in mathematics, reading, as well as most other academic activities and intellectual abilities are naturally intercorrelated. Such intercorrelations can be expected to be present in the data used for the cases in this study as it was obtained from the files of children. These intercorrelations may be represented in the ratings given the cues by the subjects. For subject 4, the Spache reading test score, the three WRAT test scores, Academic History, Woodcock reading test score, and the VMI (a measure of visual-motor integration) are all highly correlated with the diagnoses. Consequently, the ratings given the cues are intercorrelated themselves.

The results of multiple regression analysis are affected by intercorrelations between the cues. Although a stepwise regression was completed to limit the effects of such intercorrelations, the effects are still present in the results. Data presented in the cases was scaled in several ways, e.g., age equivalents, grade equivalents, scores in deviation form. The lack of similar scales prevents the direct measure of their intercorrelations. The rescaling of the values was accomplished by the subjects' interpretation of the data resulting in the ratings given the cues. These effects are best

seen in the contribution of the Spache and Woodcock reading test scores to the prediction equations (Tables 1 and 2). While both cues tend to be highly correlated with the diagnoses given, they may not both be included in the prediction equations. High intercorrelations may prevent one or the other from entering the prediction equations. The presence or absence of cues in the prediction equations does not clearly indicate the relationship of cues to judgment.

The natural intercorrelations of cues also affects the interpretability of the results of factor analysis. Factor analysis attempts to identify cluster of variables that are inter-related, i.e., intercorrelated. If the intercorrelations of ratings given academic cues are primarily representative of the intercorrelations of the cues themselves, then a factor containing academic cues is best interpreted as a reflection of the correlations of academic abilities. While the ratings given cues are a measure of the school psychologists' subjective understanding of the cues, the academic factor found in this study is not solely a result of the subjects' cognitive organization of the cues.

While this study was not designed to directly measure the effects of intercorrelations present in naturalistic data, such effects are readily obvious.

Discussion

The diagnostic decisions of school psychologists investigated in this study can be successfully predicted by use of multiple regression analysis as used in numerous studies of other professional groups. The techniques that have been applied to decision making for other groups may also be applied to the work of school psychologists with similar results. The adequacy of these

techniques in modeling the decision making activities of school psychologists must be questioned, as they have been questioned in studies of other decision makers.

At first inspection, the results of this study seem to indicate that school psychologists possess some expert qualities in decision making. The magnitude of the multiple regression coefficients are indicative of highly consistent linear relationships between the ratings given the cues and the diagnoses. The clustering of academic variables was consistent for the subjects. Such results could be the outcome of a reasoned and careful consideration of the data by the school psychologists. Yet the school psychologists were unaware of the statistical importance associated with individual cues that allowed prediction of their decisions. These results present a confusing portrait of the decision policies of the school psychologists in this study. Such a picture has been similarly composed in the study of other professional groups.

Under close scrutiny, the foregoing interpretations of the results are not supportable. Intercorrelations in the naturalistic data used in construction of cases contributed to the intercorrelations in the ratings of the cues by the subjects. While statistical techniques are able to adjust for intercorrelations, the results are not able to clearly indicate the relationships of the cues to the diagnoses. While the prediction equations produced by multiple regression may be able to predict the diagnoses of the school psychologists, they are not able to clearly model the ways that cues are weighted or given importance by the subjects. Factor analysis cannot directly give evidence of cognitive processes resulting in a meaningful clustering of cues when those cues in themselves are intercorrelated. Statistically derived weights are inadequate to indicate the importance given cues when those cues may be evaluated in different ways.

Perhaps the most interesting finding of this study is the suggestion that some cues may not be viewed or rated in a linear fashion. Some cues, such as the Full Scale IQ, may be seen as having two simple meanings in this task: the value is neutral or does not support the diagnosis of learning disabilities. Other cues are related to the diagnoses on the whole range of "definitely indicative of learning disabilities" through "neutral" to the opposite pole of "definitely not related to learning disabilities." Only in the latter case can it be said that cues are viewed or rated in a linear fashion by the decision maker and can the decision making processes be adequately modeled by statistical techniques based in linear models. A whole range of sophisticated statistical tools are rendered inadequate. A return to the simple observation of frequencies may prove more helpful in understanding the methods of decision making than the application of advanced statistical tools.

Though this study was limited to decision making for one diagnostic category, the findings indicated that school psychologists evaluate and combine information in an orderly and reliable fashion when making decisions. The results did not fully support the notion that school psychologists exhibit the expert characteristics of giving similar weights when approaching a decision.

The implications of this study to the profession of school psychology are suggestive of future developments in the training of its practitioners. It may be concluded that experience and training of school psychologists, whether during graduate education or from job responsibilities, give school psychologists adequate information about the diagnostic category of Learning Disabilities and the meaning of various cues to allow decision making with a fair degree of confidence. The consistency between the ratings of cues and judgments argues that the decision making activities can be characterized by

logical and orderly processes. If confidence and orderliness in decision making are important characteristics of professional abilities, then the results of this study indicate that school psychologists exhibit such abilities.

Decision making by school psychologists is at least partially orderly. This study has met some success in the description of that orderliness. Such findings could form the basis for the construction of models for the evaluation, combining, and weighting of information. These models could form the basis of a curriculum aimed at limiting the tendency of clinical instruction to be based in personal experience. Recognition of research findings would become essential in quantifying the relationships of cues and judgments. The effects of misleading or extraneous information could be lessened at the same time insuring that important information was not discarded accidentally. Instructional activities could be developed to help students explore their idiosyncratic patterns of decision making, become familiar with decision models drawn from normative studies of human behavior, and develop prescriptive models for decision making. Instruction of models for the evaluation of data would replace the typically intuitive or piecemeal approaches to decision making which have characterized the graduate education of school psychologists.

Note 1

The variables appearing in each case consisted of the following. The abbreviations used in tables are also indicated.

Abbreviation	Variable
Sex	Sex
Age, Grade	Age: Year and month) combined measure of placement Grade: Year and month) for age
Spache	Spache Instructional Reading Level, grade equivalent
FSIQ	WISC-R Full Scale IQ
PIQ vs. VIQ	Comparison of WISC-R Performance and Verbal IQs -- size and direction of difference between scores
Digit Span	Comparison of WISC-R Digit Span Score to mean subscale value: within or beyond one standard deviation of the mean
Coding	Comparison of WISC-R Coding Score to mean subscale value: within or beyond one standard deviation of the mean
WRAT Reading	Wide Range Achievement Test Reading Score in grade equivalents
WRAT Spelling	Wide Range Achievement Test Spelling Score in grade equivalents
WRAT Arithmetic	Wide Range Achievement Test Arithmetic Score in grade equivalents
Woodcock Reading	Woodcock Reading Test -- total score in grade equivalent
VMI	Visual Motor Integration Score in grade equivalent (either Berry or Bender-Gestalt)
Development	Rating of Appearance of Developmental Milestones -- delayed to advanced
Attitude	Rating of Child's Attitude Towards Academic Work -- easily frustrated and distracted to accepts challenge and is persistent
Behavior	Rating of Child's School Behavior -- relates poorly to peers and is disruptive to relates well and accepts authority

Academic History	Rating of Academic History -- no history of difficulty or slowness in learning to history of difficulty for more than one year
Vision and Hearing	Rating of Hearing and Vision no difficulty with either to definite need for additional testing

BIBLIOGRAPHY

Beatty, James R. Identifying decision-making policies in the diagnosis of Learning Disabilities. Journal of Learning Disabilities, 1977, 10, 201-209.

Chasen, Barbara Diagnostic sex-role bias and its relation to authoritarianism, sex-role attitudes and sex of the school psychologist. (Doctoral dissertation, New York University, 1974) Dissertation Abstracts International, 1974, 35(5-B), 2400.

Coles, Gerald S. The Learning Disabilities test battery: empirical and social issues. Harvard Educational Review, 1978, 48, No. 3.

Cook, Richard L. and Stewart, Thomas R. A comparison of seven methods for obtaining subjective descriptions of judgmental policy. Organizational Behavior and Human Performance, 1975, 13, 31-45.

Dawes, R.M. A case study of graduate admissions: Application of three principles of human decision making. American Psychologist, 1971, 26, 180-188.

DeWitte, Linda Lee The effects of client race and social class on the attitudes and decisions of school psybhologists. (Doctoral dissertation, University of Cincinnati, 1976) Dissertaion Abstracts International, 1977, 37(7-B), 3603-3604.

Goldstein, Rose S. The relationship of traditionalism, progressivism, and authoritarianism of school psychologists to child placement in classes for retarded children. (Doctoral dissertation, New York University, 1973) Dissertation Abstracts International, 1973, 34(2-B), 873-874.

Hoffman, Paul J. The paramorphic representation of clinical judgment. Psychological Bulletin, 1960, 57, 116-131.

McDermott, Paul A. Measures of diagnostic data usage as discriminants among training and experience levels in school psychology. Psychology in the Schools, 1977, 14, 323-331.

Nie, N.H., Hull, C.H., Jenkins, J.G., Steinbrenner, K., and Bent, D.H. Statistical Package for the Social Sciences. San Francisco: McGraw-Hill Book Company, 1975.

Palisin, Helen E. Modeling clinical judgments of pediatric nurse practitioners. Unpublished doctoral dissertation, University of Washington, 1977.

Robison, David, Wahlstrom, Owen W., and Mecham, Robert C. Comparison of job evaluation methods: a "policy capturing" approach using the position analysis questionnaire. Journal of Applied Psychology, 1974, 59, 633-637.

Schmitt, Neal, and Coyle, Brian Applicant decisions in the employment interview. Journal of Applied Psychology, 1976, 61, 184-192.

Shanteau, James and Phelps, Ruth H. Livestock judges: How much information can an expert use? Organizational Behavior and Human Performance, 1978, 21, 209-219.

Slovic, P. Analyzing the expert judge: A descriptive study of an stockbroker's decision processes. Journal of Applied Psychology, 1969, 183, 482-488.

Slovic, P. and Lichtenstein, Sarah Comparison of Bayesian and regression approaches to the study of information processing in judgment. Organizational Behavior and Human Performance, 1971, 6, 649-744.

Soethe, James W. An analysis of judgments made by four groups of professional educators and their student counterparts. (Doctoral dissertation, University of Colorado, 1973) Dissertation Abstracts International, 1974, 34(7-A), 4009.

Table 1

F Values to Enter Stepwise Regression Equation

Subject	1	2	3	4	5	6	7	8	9	10
Variable										
Sex	nv	.45	2.65	nv	nv	.05	nv	nv	nv	1.00
Age, Grade	.77	1.84	.07	.16	nv	.16	.17	1.61	.00	.94
Development	3.96+	.16	3.66	.02	.00	.05	9.97*	3.75+	.92	2.35
Spache	8.76*	2.87	39.90*	151.52*	5.82+	.37	.16	4.42+	.19	4.57+
FSIQ	.23	32.11*	.00	.80	.13	12.62*	.16	1.09	2.83	3.67+
PIQ vs VIQ	4.49+	.37	.16	8.68*	6.56+	.21	1.49	3.96+	1.46	4.71+
Digit Span	4.12+	.42	1.45	.10	1.85	.00	2.63	2.14	1.85	.07
Coding	.64	4.81+	.13	.73	8.40*	.03	1.62	.59	.27	2.42
Attitude	.53	10.99*	.01	4.65+	.45	.51	2.18	2.77	5.30+	.01
Vision and Hearing	1.08	2.89	3.40	2.27	.76	.04	2.06	nv	9.43*	2.13
WRAT Reading	6.72*	.00	.38	1.62	.04	.27	22.19*	.47	49.87*	.03
WRAT Spelling	26.06*	16.57*	.67	6.52+	15.42*	110.82*	.55	.22	1.54	4.06+
WRAT Arithmetic	.44	2.45	14.56*	50.13*	.54	5.60+	.44	16.96*	.27	17.31*
Behavior	.46	257.04*	6.24+	4.58+	3.01	.44	.28	.35	.88	.10
Academic History	13.91*	4.84+	.38	36.98*	.54	2.72	155.48*	15.75*	.27	.21
Woodcock Reading	353.04*	.28	479.05*	.00	66.63*	34.67*	8.26*	83.93*	7.34*	53.10*
VMI	26.95*	56.89*	2.55	3.39*	11.04*	6.88*	15.41*	6.64+	26.29*	72.21*
No. of Significant Variables	9	7	4	8	6	5	5	7	5	7

* $p < .01$
\+ $p < .06$

nv no variance found for that variable

Table 2

Relative Weights[a] for Variables in Equation[b]

Subject	1	2	3	4	5	6	7	8	9	10
Variable										
Sex										
Age, Grade							14	- 1		
Development	- 2							16		13
Spache	28		41	26	19					1
FSIQ		19				9		2		1
PIQ vs VIQ	1			6	7					
Digit Span	2									
Coding		7			7				9	
Attitude		10		7					13	
Vision and Hearing							18		36	
WRAT Reading	14									9
WRAT Spelling	15	15		17	22	37				
WRAT Arithmetic			10	15		20		13		13
Behavior		18	10	- 3			38	10		
Academic History	11	13		26			20	31	26	20
Woodcock Reading	23		39		35	22	13	6	22	45
VMI	12	18		10	17	15				
No. of Variables	9	7	4	8	6	5	5	7	5	7
Multiple R	.94	.94	.94	.90	.75	.82	.85	.78	.72	.82
R Square	.88	.88	.88	.82	.57	.68	.72	.62	.52	.68
R Square Adj.	.87	.87	.87	.80	.54	.66	.71	.59	.50	.66

a relative weights have been multiplied by 100

b stepwise regression

Table 3

Results of Factor Analysis

Eigenvalues and Variance

Subject	1	2	3	4	5	6	7	8	9	10
Factor										
1 Eigenvalue	4.83	9.22	7.62	5.52	3.22	4.94	5.70	3.37	3.44	3.61
% of Variance	30.2	54.3	44.8	34.5	21.5	29.1	35.7	22.4	21.5	21.2
2 Eigenvalue	1.55	1.47	1.52	1.68	1.90	2.01	1.79	1.99	1.57	2.05
% of Variance	9.2	8.7	9.0	10.5	12.7	11.8	11.2	13.3	9.8	12.1
3 Eigenvalue	1.42		1.38	1.47	1.40	1.38	1.50	1.41	1.36	1.64
% of Variance	8.9		7.6	9.2	9.3	8.1	9.4	9.4	8.5	9.6
4 Eigenvalue	1.21			1.26	1.25	1.24	1.09	1.27	1.29	1.42
% of Variance	7.6			7.9	8.3	7.3	6.8	8.5	8.1	8.3
5 Eigenvalue	1.05			1.10	1.42	1.16		1.14	1.24	1.26
% of Variance	6.6			6.9	7.6	6.8		7.6	7.8	7.4
6 Eigenvalue					1.05			1.01	1.13	1.17
% of Variance					7.0			6.8	7.1	6.9
Accumulated Variance	63.0	62.9	61.4	68.9	66.4	63.1	63.0	68.0	62.8	65.5

Table 4

Factors on Which Variables Loaded[a]

Rotated to Varimax Criteria

Subject	1	2	3	4	5	6	7	8	9	10
Number of Factors[a]	5	2	3	5	6	5	4	6	6	6
Variable										
Sex		2				5				3
Age, Grade	5	2	2	3		2	4	4	3	2
Development			2	3,5	6	2	2*	2*	3	2
Spache	1*	1	1*	1*	2*	1	1	1*	1	1*
FSIQ	2	1*	1,2	5	4	3*	3	6	3	2*
PIQ vs VIQ	4*	1,2		3*	4*	3	3	5*	6	3*
Digit Span	4*	1,2	3	2	3	5	2	4	6	5
Coding	4	2*	3	2	3*	5	2	4	6	5
Attitude	3	1,2*	3	2,4*	3	4		3	4*	4
Vision and Hearing	2	2	2	4	6	2	2,3		5*	3
WRAT Reading	1*	1	1	1	1	1	1*	1	1,2*	1
WRAT Spelling	1*	1*	1	1*	1*	1*	1	1	8	1*
WRAT Arithmetic	1	1	1*	1*	1	1*	1	1*	8	1*
Behavior	3	1*	1*	4*	5		1	3	5	6
Academic History	1*	1*	1	1*	5	1	1*	2*	1	4
Woodcock Reading	1*	1	1*	1	2*	1*	1*	1*	1*	1*
VMI		1*		1*	2*	1*	4*			6

a only loadings over .5 included
b eigenvalues greater than one
* variable that entered the multiple regression equation

Table 5

Stated Policies[a] of Judges

Subject	1	2	3	4	5	6	7	8	9	10
Variable										
Sex	2	2	5	2	2	4	1	3	2	2
Age, Grade	4	4	5	5	5	5	5	4	5	4
Development	5	4	5	5	4	4	3	4	4	5
Spache	2	3	2	4	5	3	4	4	4	4
FSIQ	3	3	4	5	4	3	5	3	4	4
PIQ vs VIQ	4	4	5	5	4	5	4	4	5	5
Digit Span	4	3	5	3	4	4	4	4	2	4
Coding	4	3	5	3	4	4	3	3	3	4
Attitude	5	4	5	5	3	4	5	5	5	5
Vision and Hearing	4	5	5	5	4	4	5	4	4	3
WRAT Reading	2	3	2	2	3	3	3	3	2	2
WRAT Spelling	2	3	2	4	4	3	3	4	2	4
WRAT Arithmetic	2	3	2	4	4	3	3	4	2	4
Behavior	5	4	5	5	3	4	5	5	4	4
Academic History	5	4	5	5	4	4	5	5	4	5
Woodcock Reading	2	4	2	4	3	3	5	4	3	5
VMI	4	4	5	4	4	2	4	4	3	5
Correlation[b] with r's in Table 6	-.31+	0	-.65*	-.37+	.03	-.55*	-.03	.13	-.27	.12

a ranked on a scale of 1 to 5, (1) not useful to (5) very useful.
b Kendall's Tau
+ $p < .05$
* $p < .01$

Table 6

Correlations[a] Between LD and Predictors

Subject	1	2	3	4	5	6	7	8	9	10
Variable										
Sex	nv	42*	20+	nv	nv	9	nv	nv	nv	11
Age, Grade	4	48*	38*	20+	nv	6	21+	- 5	8	6
Development	31*	53*	34*	23*	-12	3	46*	7	23*	15+
Spache	86*	76*	88*	75*	53*	51*	60*	61*	46*	49*
FSIQ	- 4	80*	64*	21+	8	32*	37*	-10	3	3
PIQ vs VIQ	10	64*	32*	38*	20+	32*	43*	15+	11	8
Digit Span	33*	67*	36*	46*	27*	26*	49*	8	16+	16+
Coding	- 4	59*	21*	23*	19+	- 2	34*	3	1	2
Attitude	37*	80*	47*	47*	9	22*	57*	34*	25*	9
Vision and Hearing	3	24*	53*	15	1	25*	- 7	nv	-26*	10
WRAT Reading	77*	71*	79*	72*	49*	64*	61*	50*	55*	49*
WRAT Spelling	71*	79*	70*	69*	51*	70*	51*	46*	43*	46*
WRAT Arithmetic	63*	72*	65*	65*	30*	67*	46*	41*	30*	49*
Behavior	22*	83*	70*	27*	17+	30*	46*	12	- 9	-17+
Academic History	58*	78*	65*	73*	22*	54*	75*	38*	41*	38*
Woodcock Reading	87*	76*	90*	69*	60*	63*	66*	64*	49*	56*
VMI	52*	73*	57*	64*	42*	60*	50*	35*	42*	62*
No. of Significant Variables	11	17	17	15	11	13	15	9	11	10

a Decimal points omitted. nv no variance found for that variable

* $p < .01$ two tailed.

\+ $p < .05$ two tailed.

Table 7

Response Frequencies
For Each Variable

Subject 4	Definitely not Indicative of L.D.		Neutral		Definitely Indicative of L.D.
value	1	2	3	4	5
variable					
Sex			120		
Age, Grade			117	4	
Development		5	112	3	
Spache	20	49	15	36	
FSIQ		14	106		
PIQ vs VIQ		2	106	12	
Digit Span		3	103	14	
Coding		4	111	5	
Attitude		23	81	16	
Vision and Hearing	1	25	93	1	
WRAT Reading	16	38	29	37	
WRAT Spelling	6	34	40	40	
WRAT Arithmetic	2	40	40	38	
Behavior		14	105	1	
Academic History	12	15	75	18	
Woodcock Reading	19	36	22	43	
VMI	13	42	38	26	1
Judgment	23	44	14	39	

School Psychologists and Clinical Judgement: Patterns of Data Utilization

Jan D. Carline, Ph.D.

University of Washington

Abstract

School psychologists function as experts in the diagnosis of childrens' educational difficulties. Can the decision-making activities of school psychologists be characterized as expert? Ten practicing school psychologists were asked to review 120 cases of children being considered for placement in learning disabilities programs. A case consisted of 17 educational cues, including scores from achievement tests and ratings of other aspects of academic and social performance. Subjects were required to rate each cue as to its relevance to a diagnosis of learning disabilities for the child represented in the case and then to offer a diagnosis for the child. The ratings of cues and the diagnoses were analyzed to describe the decision-making characteristics of each subject.

The ratings of cues and decisions were highly correlated for each subject, indicating great consistency in the ways that individual cues were related to diagnoses. Further, subjects clustered cues in similar fashions when approaching a decision. The decision making activities represented in these results may be characterized by logical and orderly processes. If orderliness is an important characteristic of expert abilities, then the results indicate that the decision-making of school psychologists may be deemed expert.